WORLD CARGO SYMPOSIUM

MARINA BAY SANDS – SINGAPORE
12 – 14 March 2019
HORIZON
The Air Cargo Innovation Forum
Kindly Sponsored by:

wipro
Welcome Address

Celine Hourcade
Head, Cargo Transformation
IATA
Keynote:
The Cargo Facility of the Future

Brendan Sullivan
Head, e-Commerce & Cargo Operations
IATA
Cargo Facility of the Future

Brendan Sullivan
Head, E-Commerce & Cargo Operations

13 March 2019
Case for Change

- Industry set to double in size by 2035
- Strong E-Commerce growth (20-25% per year)
- E-Commerce, Drones, Automation, AR/AI all driving process change
- Ongoing regulatory demands and complex changes
- Organizational capability
- Labor constraints
- Training and competencies
What is an air cargo facility used for and why does it need to be different in the future?
Is there only ONE cargo facility of the future?
One Size Fits All?
6 technology trends

- Augmented Reality & Wearables
- Robotics & Automated Systems
- IoT, Connected Cargo & Devices
- Drones & Autonomous Vehicles
- Big Data / Predictive / AI / Deep Learning
- Green, sustainable, net zero buildings
Where do Technology Innovation and Operations intersect?
How do we automate air cargo flows?
“smart, connected, green, safe and secure, and fit for purpose in size, location and for the people who use it.”
Projects

Smart Facility

Interactive Cargo

NEXTT

Drones

Exploration

AR and VR for air cargo

Smart ULD

White Papers

E-Commerce

Cargo Facility of the Future
Thank you

Brendan Sullivan
Head, E-Commerce & Cargo Operations
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The Innovation Tornado: Where Are We with AR, VR, IoT, Automation, Robotics and Unmanned Vehicles?

Ashish Pradhan
Global Head, Airlines
Wipro
The innovation tornado

Ashish Pradhan
Global Head – Airlines
Wipro Ltd

Disclaimer:
Examples quoted are entirely from publicly available sources on the Web discovered as part of the research done for this WCS Session. No claim of authenticity is being made here.
Air Cargo Operational Processes

- Shipment Measurements
- Order picking process
- Optimized freight loading

- Inflight monitoring - PER & AVI shipments
- 3D view of flight & Build planning
- Inflight real time Video monitoring (AVI)

- Autonomous tugger for Large payloads
- Robots for sorting & Last mile delivery
- Drones in the Warehouse

Emerging technology enablers

AR & VR
IOT
Robotics & Automation
Unmanned Vehicles
Blockers for Innovation to watch-out for

- Legacy Systems & Investments (lack of)
- Slow technology adoption
- Less collaboration between Business & IT
- Slow adoption to changing Regulations
Where are we with AR, VR, IoT, Automation, Robotics & Unmanned (Aerial) Vehicles?
Expert’s view about emerging technology maturity

Which Technology get the focus of digital investments (In %)

- Internet of Things: 63% (Today), 73% (In 3 Years)
- Artificial Intelligence: 54% (Today), 63% (In 3 Years)
- Robotics: 15% (Today), 33% (In 3 Years)
- Augmented Reality: 10% (Today), 24% (In 3 Years)
- Virtual Reality: 7% (Today), 15% (In 3 Years)
- Block Chain: 3% (Today), 11% (In 3 Years)
- Drones: 5% (Today), 14% (In 3 Years)

Source: PWC
“AR technology plays a vital role in digital transformation of logistics industry”

DHL uses AR for picking process

AR were successfully tested by giant companies like Boeing, Coca-Cola, and General Electric.

Replacement of navigation systems in delivery vehicles with AR devices & display temperature

LH cargo - AR technology enables assessing volume of an aircraft pallet of packages with 3D view

Source: Published news
“VR is a technology poised to break into the main stream consumer consciousness in the very near future”

Fraport, IATA team up to test virtual reality training platform for ground ops

Hactl achieves all-round improvement with VR training

DSC tests virtual reality training technology for forklift operators

Airbus uses VR to demo planes for the customers

Source: Published news
IoT fueling logistics industry: Soar high with a delightful customer experience

AirBridgeCargo Airlines uses Bluetooth technology to enable full tracking, status updates of its pallets and containers.

Virgin Atlantic is taking its use of IoT to new fleet of Boeing 787 planes and cargo equipment connected via IoT devices.

Wipro’s innovation for one of the world’s leading biopharmaceutical companies. A Digital Supply Chain & Anti-Counterfeiting Solution built on IoT, Blockchain and Cloud technologies.

IoT enabled devices generate data for assets starting from shelf life to delivery of the product.

Source: Published news
Robotics in logistics is a game shifter?

700 robots working in Cainiao, a Chinese logistics firm

JD Logistics uses robots for last-mile delivery

Geodis done pilot program using 21 cobots for their e-commerce division

Amazon using thousands of Kiva Systems mobile robots used for piece-picking

Source: Published news
Un-Manned vehicles-the road to the future?

The Jungheinrich Auto Pallet Mover uses laser navigation technology.

KNAPP. Using laser navigation technology for picking activities involving cartons and containers.

MultiShuttle Move, swarm of self-driving vehicles handling small load carriers and pallets.

easyJet uses drones to assess aircraft damage.

Source: Published news
Automation is inevitable

FedEx & Vecna – Introduces RT4500 autonomous tugger helps point-to-point transport of large payloads

An AS/RS system of machines helps in measuring the shipment dimension and sends data and get right storage position.

Qatar Airways uses Lodige systems for loading & Storing ULD’s

Bastian Solution’s pick to light systems provide you with an efficient picking

Source: Published news
Industry initiatives, we read in media

HACTL - Hong Kong’s largest independent cargo handler Green terminal project with installation of 1300 Sqm Solar panels

FedEx Driverless neighborhood making deliveries

Source: Published news
Industry initiatives, we read in media

ABC and CLA team up with SITAONAIR for in-flight cargo monitoring

EffiBot fully automated trolley that follows pickers through the warehouse and takes care of most of the physical work

Source: Published news
Industry initiatives, we read in media

Geodis will use drones to scan consignments for a completely automatic warehouse inventory solution.

SATO launches Next generation IOT enabled printers helps in warehouse productivity.

Source: Published news
Wipro initiatives

- Virtual reality
- IoT
- Augmented reality
Case-study: Secure Cold Chain Solution from Wipro (IoT + Blockchain)

Leading Pharma Customer uses for Supply Chain Tracking
Case-study: Secure Cold Chain Solution from Wipro (IoT + Blockchain)
Questions
Thank You for your time

Ashish Pradhan
ULDs Are Getting Smart!

Moderator:
• Zhi Yong Liao, Manager, Cargo Business Process and Standards & Secretary of the ULD Board, IATA

Presenters:
• Adam Barrington-Spencer, Vice President, Sales & Marketing, Aerotuf
• Arnaud Brolly and Aurore Duhamel, Portfolio Manager, Airline Operations, Air Travel Solutions and Product Manager New Technologies, SITA
• Markus Flacke, Head of Product Management & Solution Development, Unilode Aviation Solutions
Air New Zealand Cargo & Cargo Composites – Keep it Cool with aeroTHERM ULD

Adam Barrington-Spencer
Vice President, Sales & Marketing
Aerotuf
KEEP IT COOL
with
AeroTHERM

Presented by Air New Zealand Cargo & AEROTUF
SITA, Safran & CHAMP – Smart ULD

- **Arnaud Brolly**, Portfolio Manager, Airline Operations, Air Travel Solutions, SITA
- **Aurore Duhamel**, Product Manager New Technologies, SITA
SMART ULD

- Arnaud Brolly & Aurore Duhamel (SITA)
- Lucas Fernandez (CHAMP)
- Emmanuel Couturier (Safran Electronics & Defense)

Mars 11th, 2019
SITA – CHAMP – SAFRAN

Air Cargo Know-how

Global technology

Renowned manufacturer
Complex Air Cargo ecosystem with many actors and processes

- Large number of actors which slower the process
- Difficulties to track assets provenance, history and real-time status monitoring
- Many paper-based processes for certification across the supply chain
SMART ULD SOLUTION OVERVIEW

A world where data is captured by Mobile & IoT, managed by Blockchain, and automated by AI.
SMART ULD – Mobile & Internet of Things (IoT)

Smart Devices
- Aero-compliant sensors
- Geolocation
- Monitoring

Network
- Low power wide area network (LPWAN)

Platform
- Mobile - IoT
- Cargo Type B messages integration

Presentation
- Mobile App (check-list, document, map...)
- Dashboard
SMART ULD – Mobile & Internet of Things (IoT)

Handling

Monitoring & Analytics
SMART ULD – Blockchain

- Integrate multiple data source in the Blockchain
- Track, trace and monitor moving assets (ULD…) during transportation
- Share event visibility and data across all supply chain stakeholders
- Orchestrate and optimize Supply chain process
**SMART ULD – Blockchain**

Manage and transact cargo-ULD data among a network of nodes through a distributed ledger.

### Use-cases

- Chain of custody
- Alerting & Disruption management
- Trade finance
- Customs document digitization
Develop analytics to optimize processes

- ULD Demand Prediction
- Serviceable ULD Repositioning Recommendations
SITA SMART ULD – Innovation highlight!

Unique combination between Mobile, IoT, Blockchain and AI technologies

Mobile & IoT
- Move ULD handling Operations to Digital
- Provide ULD Geolocation Indoor (BLE) and Outdoor (GPS & Crowd Geoloc)
- Enhance ULD Monitoring & Alerting: Temperature, shock, vibration, humidity…

LPWAN Sensors & Connectivity
- No Labor / Infrastructure required
- Global reach/Long distance/Low energy

Blockchain and Smart Contract
- Permanent, shared digital public ledger of transactions
- Enhanced Transparency and traceability from origin to destination
- Real-time visibility of processes and assets location

Artificial Intelligence
- Improved inventory management with enhanced forecast of demand
THANK YOU
Unilode Aviation Solutions – Digital Transformation

Markus Flacke
Head of Product Management & Solution Development
Unilode Aviation Solutions
Digital transformation
by Unilode

Creating the world’s first fully digitised ULD fleet

Mr. Markus Flacke, Head of Product Management & Solution Development

Horizon – The Air Cargo Innovation Forum
Monday, 11th March 2019
Singapore
Introducing
Unilode Aviation Solutions
About Unilode

History, facts and figures that add up to excellence

25+ years of experience combined in CHEP Aerospace Solutions launched in 2011, acquired by EQT in 2016 and rebranded as Unilode in 2017

Providing ULD management and ULD and galley cart maintenance and repair services worldwide

135,000+ ULDs owned and managed across 480+ airports 24/7/365 for 40+ mainline, cargo, leisure and regional airlines

Helping customers save ~ 27 million USD in fuel cost and cut CO₂ by 150 thousand tons annually

50 repair centres, 30 of which are owned by Unilode, certified by EASA, FAA and local aviation authorities

430,000+ ULD and galley cart repair work orders and 8,000+ ULD assemblies annually for 50+ customers

Smart IT and tracking solutions combined with dedicated account management with a wealth of aviation experience

650+ employees working in offices, repair centres and ground supervision stations in 45 locations worldwide
Unilode customer portfolio

Longstanding global MRO and ULD Management partnerships we are proud of
Unilode’s Business Idea

Digital Transformation by means of BLT equipped ULDs

Use Cases:

- **Forwarder-to-Forwarder Solutions**
  - Forwarder with special cargo requirements
  - Use cases:
    - ULD Warehouse Inventory
    - ULD Inflight Tracking e.g. temperature
    - Damage Control

- **Airport-to-Airport Solutions**
  - Airlines/ ULD management customers, Ground Handlers
  - Use cases:
    - ULD Inventory Management e.g. unreported, loss
    - ULD Inflight Tracking e.g. temperature
    - Ground Handler – Ground Support Equipment Control
    - Damage Control, Inventory Control

- **End-to-End Solutions**
  - Shippers with specific cargo requirements
  - Use cases:
    - Full E2E Tracking with Reader equipped ULD
    - Associating data with shipment or serialized packaging

Track & Trace:

- Flight Tracking*
- Airport Tracking
- Off Airport Tracking
- End-to-End Tracking
Unilode supports the industry’s digitalisation efforts

Industry benefits estimated at 200 million USD per year

**Increase cargo velocity through greater transparency**
ULD digitalisation provides full visibility on your cargo, both on the ground and in flight, anytime, anywhere. It enables you to operate at lower cost whilst achieving faster throughput.

**Optimise your supply chain management**
ULD digitalisation enables individual shipments to become part of a connected ecosystem. By associating your e-Air Waybill (e-AWB) with a digitised ULD, the ULD becomes a proxy for tracking shipments.

**Improve the utilisation of your equipment**
ULD digitalisation optimises the utilisation of your ULDs, improving stock control, availability and (dis)positioning. Whilst increasing the safety of your ULDs and cargo, you will incur less costs for damage and loss.

**Enhance the service delivery to your customers**
ULD digitalisation includes sensor information allowing you to offer quality assurance e.g. on temperature sensitive cargo. Technology capable of being read in flight makes it possible to take action faster.

**Bring your business analytics to the next level**
ULD digitalisation gives you full control and makes it possible to accurately measure your Cargo IQ milestones. The data generated can be integrated into your own internal Cargo Management systems.
Unilode’s digitalisation programme is an industry first

Transforming ULD management into a key value-driver for the industry

Unilode is equipping all its containers with BLE 5.0 digital tags, pallet tags will be fully integrated.

Unilode is developing a back-end system delivering data to customers that gives them a competitive edge.

Unilode is building an interoperable reader infrastructure by leveraging its unrivalled global MRO and customer network.

Unilode is collaborating with leading industry partners as well as partnering with airports, GHAs, freight forwarders, etc.

Unilode’s partner for the development of the digital asset tracking technology

Unilode’s partner for the development of data analysis solutions

Unilode’s partner for the development of the integrated pallet tag design
Creating non-obstructing pallet and container tags

Bluetooth®-tag seamlessly integrates tracking into pallets & containers
Mobile App allows for full shipment control

Accuracy, instant visibility, in-flight alerts – and you already own the reader

A flexible reader network is important to provide global asset visibility, eliminating manual and laborious SCM messages by GHAs. Unilode’s solution enables mobile phone reading, even during flight, and provides you with all the data you need.

Special cargo monitoring is important at all times during the journey. Mobile phones can detect Unilode tags in flight via BLE and send data to the ground via onboard WiFi, so ground and flight crews can be instantly alerted if necessary. Alternatively, a BLE 5.0 reader installed in the aircraft hold can detect tags and send data to ground via the aircraft’s communication hub.
Unilode’s service offering
Unilode’s technology creates a feature-rich environment

Bluetooth® paired with multi-sensor technology
Unilode’s Digital Solution allows partners to grow

Sensor data will create end-to-end transparency for the air cargo supply chain

Unilode’s modern sensor technology may help you to gain better control over your most critical shipments!

Location  Temperature  Humidity  Light  Shock  Alerts

Flowers  Pharmaceuticals  Perishables  Valuables & Fragile  Baggage  Quality
Unilode Digital Solution and Ground Handling Agents

A digital infrastructure that serves every stakeholder along the air cargo supply chain

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Inventory Control</td>
<td>More efficient processes</td>
</tr>
<tr>
<td>Stock Control</td>
<td>Automated SCM/UCM information</td>
</tr>
<tr>
<td>Ground Support Equipment Control</td>
<td>Track &amp; trace of your assets</td>
</tr>
<tr>
<td>Damage Control</td>
<td>Sensors create transparency</td>
</tr>
<tr>
<td>Customer Retention</td>
<td>Improved customer experience</td>
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**Unilode Digital Transformation and CARGO iQ**

An infrastructure that could accelerate quality measurement as a standard feature

- Creation of high density reader zones with low coverage. This will allow for increased location accuracy thanks to triangulation and data processing.
- Anchor tags can create ULD checkpoints, which allows to feed the actual timestamp back into the system.
- Data can also be used to support IATA’s OneRecord initiative
Unilode’s digital engagement model...

...is designed to create immediate and tangible partner benefits!

Feature rich:
- Geo location
- Temperature
- Humidity
- Shock
- Light

Innovative:
- BLE 5.0
- Integrated Pallet Tag
- Non-proprietary
- CIP Cycles

Certified:
- DO 160 compliant
- In-flight approved

Technology:
- Reader App
- Web Front End
- API Access
- Service-oriented

Network:
- Scalability through unique global ULD pool > fast roll-out

Collaboration:
- Allows for bespoke solutions
- Strong partnerships

MRO Network:
- Own global support network
- Allows for fast, efficient roll-out & maintenance

Modular:
- One-stop-shop solution
- Interoperable
- Extendable
Building a unique digital infrastructure
In 2019 Unilode will build a unique digital infrastructure

Creating end-to-end visibility of our ULD fleet

Phase 1
In 2019 Unilode will:

- Equip 40,000 ULDs of its fleet with Bluetooth® tags
- Establish a reader infrastructure at 39 airports
- Offer a ULD track & trace portal to its customers

Phase 2
During Phase 2 Unilode will:

- Increase the number of Bluetooth® tagged ULDs to 90,000
- Make Bluetooth® reader infrastructure available at more than 100 airports
- Automate ULD control messages

Phase 3
By the end of Phase 3:

- 100% of the Unilode ULD fleet will be Bluetooth® - tagged
- Bluetooth® reader infrastructure will be implemented at more than 254 airports
- Full set of digital value-add features will be available
Unilode’s digital infrastructure roll-out happens in 2019

Building a global reader network in two waves at 39 selected airports

Europe, Middle East & Africa

<table>
<thead>
<tr>
<th>Wave 1</th>
<th>Wave 2</th>
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<td>AMS, CDG, FRA,</td>
<td>CAI, CPH, DXB,</td>
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<tr>
<td>JED, LHR, LUX,</td>
<td>LIS, MED, NBO,</td>
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<td>MAD, MXP, RUH</td>
<td>ZAZ</td>
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The Americas

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<tr>
<th>Wave 1</th>
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Asia-Pacific

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<td>PVG, TPE</td>
<td>KUL, PEK, SIN,</td>
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<td>SYD</td>
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Unilode believes in a non-proprietary infrastructure

The use of standard BLE protocols enables the use of any reader infrastructure.
Digital Smart Identity & Biometrics

Serge Hanssens
Partner
PwC
Augmented Reality to Accelerate ULD Build-up

Harald Sieke
Fraunhofer Institute
Augmented Reality to accelerate ULD Build-Up

IATA WCS – Fraunhofer IML

Singapore, 2019/03/11
Changes in Air Cargo Handling?
Picture of the Future - Air Cargo Airport current research projects
Way to the future - Augmented Reality in Air Cargo Handling

1. Teaching
   - Contour
   - pile factor
   - mixed-load prohibition
   - Pallet weight and balance

2. Contour check
   - Database for contours

3. Build-Up
   - 3D scan of pieces
   - Software

Source: ASFS/ Fraunhofer IML
Scannen: Feder
Loading optimization

Packing pattern software Puzzle
1. Pre-calculation and optimization in load planning
2. Exercise tool for the qualification of specialists
3. Visual support of manual activities
4. Automation: Packing pattern optimization for robots

Features in preparation:
- Use of 3D scanners for individual contour detection of an article
- Optimization for containers and other load carriers

Effects of AR on the ULD Build-Up:
- Faster contour check via AR
- Faster assembly of ULDs via AR

Pictures: Fraunhofer IML
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„We AR ready!“
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Mobile Apps to Simplify Labor-intensive Tasks in the Warehouse

Sabari Ramnath
Cargo Industry Manager
Unisys
Mobile Apps to Simplify Labour Intensive Tasks in the Warehouse

Sabari Ramnath
Cargo Industry Manager, Unisys
CHALLENGE:
Inefficiency

Simplified, Automated and Faster
CHALLENGE: Lack of Transparency

Absolute Transparency with Actionable Intel
CHALLENGE:
Incompetency

Connected Cargo Environments Powered by Technology
Thank You

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